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(54) **PRESSING APPARATUS.**

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Description

This invention relates to pressing apparatus including irons of the type for pressing or smoothing clothes, sheets or other articles made from fabric material, such pressing irons and their use being hereinafter referred to as "irons" and "ironing", and also to ironing boards.

It is conventional ironing practice, particularly in the domestic situation, to employ an unheated padded ironing surface, commonly referred to as an ironing board or ironing table, on which the article to be pressed is placed, in combination with a heated hand-held iron. The iron is generally self-heated by means of an internal electric heater element controlled to a predeterminable temperature by means of a thermostat and connected to a power socket by means of a flexible cable and plug.

EP-A 0126530 discloses domestic laundry equipment in which an ironing board is heatable by means of an electrical heater element mounted in the board and controlled by a control circuit also mounted in the board, the control circuit including means for electrically connecting thereto an electrically-heated flat iron, whereby temperature control of the flat iron can be effected from the control circuit on the board. It is a stated preference that the iron has an electrical resistance heating element supplied from the same power supply as the electrical resistance element of the ironing board, so that control of both the iron and the board can be effected from the same circuit to maintain the required temperatures, preferably different temperatures, by a setting relating to the board temperature.

It is also known to provide a so-called "cordless" iron, such as that disclosed in patent specification GB-A-1,399827 in which the cable to the iron is dispensed with and the iron includes electrical contacts by means of which the heating element is energised when the iron is placed on a support which includes pins connected to a power source, whereby the pins are in electrical connection with the contacts and the iron is thereby heated to its operating temperature when correctly positioned on the support. The advantage of this arrangement to the user is that the cable connection is attached only to the support, thereby affording optimum freedom of movement to the user of the iron, unencumbered by the cable. However, cordless irons of the above type have attendant disadvantages, in that they need to be replaced frequently on the support for re-energisation of the heating elements. Since each re-energising period is required to be of short duration, typically while a pressed article is removed from the ironing board and replaced by an unpressed article, the rather

slow and crude control exercised by a traditional thermostat militates against effective maintenance of the required operating temperature.

This problem can in part be overcome by raising the power rating of the iron, thereby improving the rate of temperature increase. However, this does not cure the fundamental problem of slow response and hysteresis associated with the thermostat control and in any event a greater risk of contact arcing and consequent erosion is presented, due to the higher currents used, unless a microswitch or other power isolation device is included in the circuitry.

Yet a further disadvantage of existing cordless irons is that they are not sufficiently stable, when in position on the support, to withstand accidental knocks or sudden movement of the support without becoming dislodged. They are therefore potentially dangerous, particularly when the support is placed in use on a traditional ironing board which may itself be somewhat unstable, particularly to lateral forces. The device of patent specification DE-U-8 706 411 attempts to overcome this by providing an iron support which includes cooperative engagement means between the iron and support, thereby improving stability.

It is an object of the present invention to provide pressing apparatus, preferably involving a cordless iron, which overcomes the problems referred to above and improves upon the prior art. GB-A-1,399 827 discloses folding supports for an ironing board and it is a further object to provide an improved arrangement of folding legs for ironing boards.

According to the present invention, we provide ironing apparatus comprising:-

a cordless iron comprising a sole plate, a heater element which can be electrically energised and a temperature sensor in thermal contact with the sole plate;

a control module including a support platform for the iron and control circuitry including temperature selection means; and

cooperative interengagement means on the iron and the support; characterised in that the cooperative interengagement means comprises:

a tongue on the tail end of the iron, the tongue having electrical contacts on an upper surface thereof connected to said heater element; and

an abutment means disposed in a recess in the support platform, wherein the mouth of the recess is formed with an undercut region, which undercut region can accommodate the tongue of the iron when the iron is interengaged in a rest position with the support platform, the abutment means comprising electrical contacts which can be connected to a source of electrical power;

the arrangement being such that, in the rest position, the iron is disposed over-centre at a forwardly upwardly sloping angle such that the upper surface of the tongue engages the abutment means of the support platform in the undercut region and the iron is maintained in the rest position under the influence of gravity such that the electrical contacts on the tongue are maintained in contact with the contacts in the abutment means; wherein the supply of electrical power to the heater element is varied by the control circuitry according to the perceived temperature of the sole plate in relation to a temperature set by the temperature selection means.

The use of feedback control from the temperature sensor enables a higher-rated element to be used with a greater degree of sensitivity in the control thereof, compared with thermostatically-controlled arrangements.

Preferably, the control module is incorporated in an ironing board, the element of the iron being in electrical connection with the source of electrical power when the iron is positioned on the platform.

Although temperature setting may be performed by means of a rotatable selector knob connected to a potentiometer, it is preferred that selection is by means of touch-pads or pressure switches and the circuitry is electronic. In particular, power switching is advantageously performed by triacs.

In this position, it is convenient for the user to remove the iron from the platform and furthermore the stability of the iron is enhanced in that the interengagement gives superior resistance to accidental knocks compared with the mere placing of the iron on a support. Preferably, the iron is fully interengaged with the support platform in a rest position in which it is connected to a source of electrical power and is locatable in or removable from its rest position via a disconnected position, the iron describing a forward pivotal movement with respect to the support platform on moving the iron from the disconnected position to the rest position, the mouth of the recess being defined by a slot and the recess being formed with an undercut region to one side to accommodate the tongue as the iron pivots between the location/removal and rest positions. Thus, to position the iron on the platform, the iron is held in an approximately vertical position with the tail downwards and is offered to the platform such that the tongue is received in the slot, preferably on inner side shoulders which define guide means, whereupon the iron may be released or may be allowed to pivot forwardly, for example about a pivot axis between the underside of the tongue and the edge of the slot remote from the undercut region, whereby the tongue performs a corresponding rearward arcuate movement within

the undercut region, preferably guided by the guide means, until the upper side of the tongue is in engagement with abutment means to prevent further movement. The abutment means may be integrally formed as an extension of the guide means. The weight of the iron acting downwards thus urges the upper side of the tongue into continuing contact with the abutment means, thereby imparting stability to the iron in the rest position. Additional lateral stability may be provided whereby the undercut region has sidewalls which receive the tongue with marginal clearance and/or extend upwardly as raised upstanding formations to enhance the lateral stability of the iron in the rest position. Thus, the iron is stably held in the preferred forwardly sloping attitude at an acute angle to the horizontal, which is a convenient angle for the user to grip the handle of the iron to remove it from the support platform.

To enable the element to be electrically connected to the power source, respective contacts may be provided on the interengaging surfaces of the iron and the support platform, the contacts themselves being in engagement at least when the iron is in the rest position. The electrical contacts comprise live and neutral connections together with an earth connection, and temperature sensor contacts if the control circuitry is mounted in the support platform or control module. Preferably, a secondary earth connection to the iron is included, to remove any accumulated static, the force field of which may otherwise destabilize the control circuitry, before the principal earth connection is made.

Contacts for live and neutral connections on the iron are provided on the upper surface of the tongue and corresponding contacts on the support platform are resiliently mounted within the undercut region, whereby the respective iron and support platform contacts are facing each other immediately before they come into engagement as the iron is allowed to assume the rest position. Preferably, mechanical and/or electrical isolation means are provided to prevent the user or an infant from accidentally touching live electrical contacts in the undercut recess when the iron is removed from the support platform. Such means may comprise a cut-out switch actuated by the presence of the iron on the support platform, or mechanical shrouds or shutters in the undercut region, said mechanical shrouds or shutters being biased in a closed position to cover the electrical contacts in the abutment means and movable to an open position when the iron is located in its rest position to permit the contacts on the iron to contact the electrical contacts on the abutment means thereby preventing accidental access to the contacts when the iron is not in position. The shutters may be moved, for

example by sliding motion, to the open position against the bias by the act of offering the iron to the support platform. For example on locating the iron in the rest position, said tongue engages a shutter-opening mechanism thereby to move the mechanical shrouds or shutters to the open position, whereby the shutters provide protection until the tongue effectively blocks access to the contacts. One way of achieving this is for the tongue of the iron to include a pin or probe which engages with a shutter-operating mechanism. Conveniently, the pin or probe is constituted by the earth connection. In a preferred arrangement, however, the electrical contacts in the abutment means are movably mounted and biased in a retracted position in which they are contained in a housing, said electrical contacts being movable against the bias to an extended position in which they protrude from the housing for engagement with contacts on the iron; the electrical contacts in the abutment means being movable from the retracted position to the extended position by the iron on location of the iron in its rest position.

It is also preferred that the iron-support platform combination includes means for preventing current flow across the contacts unless and until the contacts are engaged, said means preventing arcing between the electrical contacts on the iron and support platform on moving the iron between its rest and disconnected positions, thereby preventing contact erosion caused by making and breaking the circuit across live contacts. One way of providing such means is to arrange the contacts so that, on location or removal of the iron or from the support platform, the contacts make or break in a predetermined sequence. This sequence can allow the control circuitry to detect the location or removal of the iron and to control the power flow accordingly, before any arcing can occur. The contacts can be arranged so that earth contacts, live and neutral contacts and temperature sensor contacts are provided, the latter forming part of a switching circuit to control the supply of power to the live contact: the arrangement being such that on location of the iron in the support platform in the rest position, the sequence of engagement is firstly the earth contact, secondly the live and neutral contacts, and thirdly the power sensor contacts, whereby the live and neutral contacts are engaged before power is permitted to flow to the live contact. On removal of the iron, the power is isolated before the live and neutral contacts are disengaged, the disengagement sequence being the reverse of the engagement sequence.

The electrical contacts or at least the power and temperature sensor contacts are preferably in the form of pads rather than pins, at least in the case of those provided on the tongue of the iron,

and may be recessed, flush with or raised relative to the surface of the tongue. Particularly when flush or raised, they are thereby to a certain extent self-cleaning and in any event may readily be purposely cleaned if necessary. Furthermore they cannot become bent or otherwise mis-aligned. They also provide a larger contact area for engaging with the corresponding contacts on the support platform, so allowing a positional tolerance for the iron on the support platform.

As already stated, it is preferred that power switching is performed by triacs rather than relays, and power switching can occur only at zero crossing of the mains supply. By way of example, at 50Hz, as in the mains United Kingdom supply, the longest possible switching time is 10m.sec., and in consequence it is important that the contacts engagement/disengagement sequence should not be completed in less than 10m.secs. This can be determined by the physical spacing of the contacts and in practice a minimum sequence time of approximately 40m.secs. can be achieved.

As an additional safety feature, power flow to the element may be permitted only if the temperature sensor is in circuit and within the correct range. Abnormal sensor readings due to short or open circuit, or excess temperature, cause the power supply to be isolated. Furthermore, a thermal fuse may be provided in the iron that will blow to cause an open circuit condition should the temperature of the iron reach a dangerous level.

The support platform is connected to a power source via a flexible cable which may optionally be retractable into the platform. The support platform may be incorporated into an ironing board or may be free-standing, to enable the iron to be used on a table or any other working surface. If incorporated into or otherwise associated with an ironing board, the board itself may be heated and the temperature of the board as well as of the iron may be controlled simultaneously by the same circuitry, in the manner envisaged in EP-A-0126530, i.e ironing board includes a heater element, the iron and board heater elements being controlled by the same control circuitry, typically by means of a common microprocessor.

An alternative form of control circuitry for such a system uses a common electronic device for simultaneous temperature control of both the iron and the board. Such circuitry may also be used for switching controls, timer and indicator lights. Using such a circuit, the user may make a particular temperature selection, according to the nature of the fabric to be ironed, and, from this single selection, both the iron and the board will be caused to be heated to pre-set and preferably different temperatures. By this means, the use of steam as an aid to achieving a high quality ironed product is

rendered unnecessary. Preferably the power rating of the heater element in the iron is greater than that in the board, to facilitate initial heating and subsequent maintenance of the selected temperature.

Conveniently, the control circuitry is activated by means of push-buttons, membrane switches or touch-pads, suitable indications or codes being included to indicate the intended use of allowable temperature selections. Audible or visual indicators may be incorporated to indicate selections made, error states and the like. Additionally a time-delay cutout may be incorporated to isolate the electrical power if the iron is absent from the support platform for longer than a pre-determined time. Furthermore the iron-receiving part of the support platform may be rotatably mounted thereon, for the added convenience of the user.

Optionally, and particularly where the support platform is incorporated in the board as an integral part thereof, the plate which constitutes the ironing surface of the board may cooperate with another plate to exert mutual pressure therebetween, whereby the board may be used as a trousers press. For example, the other plate may underly the ironing plate and may be attached to the legs of the ironing board with the support platform at one end thereof, and the plate which constitutes the ironing surface may be hinged to the underlying plate at or towards one end, whereby they may be parted at the other end for insertion of a pair of trousers to be pressed and closed together to grip, tension and exert pressure on the trousers, at least one of the plates including a heater element, also controlled by the circuitry as aforesaid. Opening and closing of the plates may be controlled by a lever arrangement in which for example the arms of a frame pivotally attached to the underside of the underlying plate towards the end remote from the hinge slidably cooperate with rollers or other bearing means carried at the sides of the ironing plate, whereby pivotal movement of the arms causes opening or closing action of the plates via a sliding pincer action. The pivoted ends of the arms may be formed to receive and retain the bearing means in the closed position against inadvertent opening. The legs, which support the ironing surface of the board in a substantially horizontal position above ground level during ironing and are foldable for storage, may be further characterised in that they are openable to an intermediate position in which the board is freely standable with the plates substantially vertical, for use in the trousers press mode as more fully explained hereinafter.

The invention also includes, in a further aspect, therefore, pressing apparatus comprising a heatable ironing board adaptable as a trousers press, in which the ironing surface of the board comprises a

plate which cooperates with an underlying plate to form a trousers press, the underlying plate being connected to a support system for maintaining the plates above ground level either substantially horizontally disposed for use in the ironing mode or substantially vertically disposed for use in the trousers press mode. In such an arrangement, a lower plate assembly comprises an upper pressing surface and an upper plate assembly comprises an upper ironing surface and a lower pressing surface cooperable with the said upper pressing surface to form a trousers press, at least the upper plate assembly including a heater element and the plate assemblies being hingeably connected together for example at one end and relatively movable between a closed position for pressing or ironing and an open position for insertion or removal of items to be pressed, the lower plate assembly being connected to a support system for maintaining the working surfaces above ground level, either substantially horizontally disposed for use in the ironing mode or substantially vertically disposed for use in the trousers press mode.

Preferably, such a board includes electrical circuitry to pre-heat the element to a desired temperature and to maintain the said temperature. Preferably also the assemblies are hingeably connected by a displaceable hinge which permits the pressing surfaces to be moved apart in the pressing mode while remaining substantially mutually parallel, to accommodate different thicknesses of items to be pressed while maintaining even overall pressing pressure thereon.

Such an ironing board preferably includes a support platform for a cordless iron and the control circuitry therefor controls the heating element or elements in the board as well as the iron to independently-programmable temperatures from a common electronic circuit, as described above.

Preferably the ironing board has a heatable surface and includes a separate pressure plate hingeably connected to the ironing platform to form a trousers press. Optionally the separate pressure plate has a heater element controlled by the same control circuitry as and to independently-programmable temperatures relative to the heater element in the ironing plate.

The folded closed position may comprise an intermediate position in which the board is free-standing with the ironing platform substantially vertical, for either free-standing storage or, additionally and when a separate pressure plate is included, for use in the trousers press mode, and a fully closed position for storage against a wall or other support.

In a further aspect of this invention an ironing board is provided, including an ironing surface and two foldable legs for supporting the ironing surface above ground level in service; wherein each leg is

pivotably attached at an upper end of the leg towards a respective end of an underside of the ironing surface and has a foot at a lower end of the leg, the legs being pivoted one to the other at a pivot point intermediate the upper and lower ends of each leg, a first leg having a knee joint means intermediate the upper end of the first leg and the pivot point; the arrangement being such that in an open position, with the knee joint means locked, the legs describe an X configuration in which the ironing surface is supported in a generally horizontal plane above ground level, and with the knee joint means in a broken position the legs can be pivoted one with respect to the other about the pivot point to a fully closed position in which upper and lower parts of the first leg above the pivot point are folded together and the feet of the legs are disposed adjacent one another in juxtaposition with one end of the ironing surface.

According to one embodiment of this aspect of the invention, a first leg is pivotably attached to the underside of the ironing platform and is provided with a knee joint between the said attachment point and its pivot axis to the other leg, whereby the knee joint is locked open when the legs are in the open position but is broken to allow the legs to assume the intermediate or fully closed positions, whereby the parts of the said first leg above and below the knee joint fold towards each other so that the foot end of the said first leg pivots towards the foot end of the other leg. Thus, with the knee joint means in the broken position, the upper and lower parts of the first leg above the pivot point can be folded together to lower the one end of the ironing surface with respect to the other end in an intermediate position, while maintaining sufficient spacing between the feet of the legs to support the ironing board on the ground in a free-standing position. The other leg may be slidably as well as pivotably attached to the underside of the ironing platform, to act as a lost motion linkage on opening or closing of the legs and optionally to provide for height adjustment of the board.

Embodiments of the invention will now be described by way of example with reference to the accompanying drawings, of which:

Figure 1 is a perspective part cut-away view showing an iron in the rest position in a parking dock at one end of an ironing board;

Figure 2 is a perspective part cut-away view of the tail of the iron depicted in Figure 1;

Figure 3 is a plan view, partly cut away, of the parking dock depicted in Figure 1;

Figure 4 is a section view along the line IV-IV of Figure 3, also showing in dashed outline the tail of an iron in the rest position;

Figure 5 is a fragmentary plan view of another parking dock arrangement;

Figure 6 is a sectional view through the arrangement of Figure 5, also showing the tail of an iron in the rest position;

Figure 7 is a side elevation showing an ironing board according to the invention in the trousers press mode with the pressing surfaces closed;

Figure 8 is a side elevation of the board of Figure 7 with the pressing surfaces open;

Figure 9 is a side elevation of the board of Figures 7 and 8 in the normal ironing position;

Figure 10 is a detail of the expanding hinge of the board of Figures 7 to 9;

Figure 11 is a circuit diagram of an electronic circuit for controlling the temperature of an iron and an ironing board; and

Figure 12 is a graph showing the performance of the electronic control circuitry.

Referring first to Figure 1, a cordless iron 10 including a body portion 11 in which is carried a heater element and a temperature sensor, a sole plate 12 and a handle 13, is shown engaged in the rest position on a support platform 14 manufactured as an integral part of an ironing board, the heel of the ironing surface of which is shown at 15. The support platform includes a fascia plate 10 having control panels 17 equipped with control buttons and warning lights, and a parking dock comprising a turntable 18. As shown in the rest position and as more fully described with reference to Figures 2-4, the iron is stably held within a recess in the turntable and sloping forwardly at an acute angle to the horizontal, the mouth of the recess being defined by a slot the ends of which have upstanding formations 19 for imparting additional lateral stability to the iron.

Referring to Figure 2, the tail end of the iron shown in Figure 1 includes a tongue 20 having a central cut-away region 21 in which is carried an earth pin 22. Electrical contacts are provided on either side of the cut-away region; as shown those for providing power to the heater element are designated 23 and those for providing connection to the temperature sensor are designated 24. The contacts 23 are slightly higher than contacts 24, considered in relation to the plane of the tongue.

Referring to Figures 3 and 4, the turntable 18 of the support platform 14 is formed with a diametrical slot 25 which defines the mouth of a recess 26 which includes an undercut region 27. Electrical contacts 28 are provided in the undercut region, resiliently mounted at an angle to the horizontal on support plate 29. The contacts are concealed from view and from touch through the slot 25 by shutters 30 which are slidingly downwardly displaceable in arcuate channels (not shown) against a spring bias, to the position shown in dashed outline at 30a. The opening and closing of the shutters is controlled by an arm 31 centrally mounted in the

slot 25 within an open-topped housing 32 which effectively divides the slot into two halves. The lower regions of the slot are formed at each end with arcuate shoulders 33. The arm 31 is electrically connected to the earth conductor of the power cable (not shown) attached to the support platform.

In use, the iron is held approximately vertically with the tail pointing downwards and the tail is offered to the slot 25 so that the earth pin 22 enters the housing 32 and engages the arm 31, thereby starting to displace the shutters 30. When the tongue 20 is at the position where it effectively blocks the mouth of the recess, the shutters are sufficiently open to permit the tongue to enter the recess until the lower corners of the tongue engage the shoulders 33. The iron is then allowed to fall forwardly allowing the tongue to perform a rearward arcuate movement, within the recess, guided by the shoulders 33, until the electrical contacts on the tongue engage the fixed contacts 28, the relative spacing of the contacts ensuring that the power contacts 23 are in engagement with their corresponding contacts 28 before the temperature sensor contacts 24. In Figure 4, the tail of the iron is shown in dashed outline in the rest position with the contacts engaged. In this Figure, the shutters 30 are shown in the closed position, although in practice, with the iron so located, the shutters would be at the position indicated 30a.

An alternative arrangement is shown in Figures 5 and 6. A turntable housing 51 as part of an ironing board parking dock has a slot 52 formed therein defining the mouth of a recess having sloping front and rear walls 53 and 54 respectively, rear wall 54 having a greater slope and forming an undercut region for receiving the tail 55 of an iron when interengaged in the rest position, as shown in Figure 6. The slot includes a central open-topped housing 56.

Electrical contacts 57-60 (57 and 60 being for power and 58 and 59 for the temperature sensor) within the parking dock are carried on a T plate 61 which is slidably mounted and biased by spring 62 to the left, as shown in the drawings. The contacts are aligned with apertures formed in wall 54. Under biasing pressure, the contacts are fully retracted behind wall 54. The leg of the T plate 61 carries a longitudinal operating arm 63 with a sloping end 64. This end is below the slit defined by the open-topped housing 56.

On offering the tail of the iron to the slot 52, the earth pin enters the slit defined by the open-topped housing and displaces the operating arm 63 to the right, thereby bringing the contacts 57-60 forward against the bias and into contact, through the apertures in wall 54, with the electrical contacts on the iron. The contacts 57-60 are themselves

individually displaceable against a bias, relative to their mountings, by springs 57a-60a, to provide substantially the same pressure between each respective pair of contacts.

Referring now to Figures 7, 8 and 9, an ironing board 71 consists of a lower plate assembly 72 having an upper pressing surface 73, and an upper plate assembly 74 the top surface 75 of which constitutes an ironing surface and the lower surface 76 of which constitutes a pressing surface which cooperates with surface 73 to form a trousers press, cooperable grippers being provided at the opening ends (one only being illustrated at 77). A support platform 14 for a cordless iron is provided at the upper end of the board (in the position shown in Figures 7 and 8) and the plate assemblies are hinged together at their lower ends at 78 by means of a displaceable hinge, in which the hinge pivot may be mounted on the upper plate assembly to be resiliently displaceable away from the lower plate assembly, for example by means of a spring steel mounting bracket attached to the lower plate assembly (see Figure 10), to accommodate trousers, or other items to be pressed, of different thickness while maintaining even pressure along the board between the pressing surfaces. Movement of the plate assemblies is controlled by a lever 79 which is hingeably mounted on the rear of lower plate assembly 72. The arms of the lever are in engagement with rollers 80 mounted on the sides of the upper plate assembly 74, so that pivoting the lever 79 forwardly permits the rollers to roll along the arms and the upper plate assembly to swing open to the position shown in Figure 8, while pivoting the lever upwardly causes the upper plate assembly to close to the position shown in Figure 7. The ends of the arms at 81 are deformed to provide a notch to accommodate the rollers and retain the plate assemblies in the closed position against unintentional opening.

As shown in Figures 7 and 8, the supporting legs of the ironing board are open to an intermediate position in which the board is free-standing with the plate assemblies substantially vertical. The board is illustrated in Figure 9 with the legs open to permit the board to be used for ironing. The leg 82 is hingeably connected to the underside of the lower plate assembly at 83 and is lockably jointed at a knee joint 84 for placing in a storage position (not shown) or for use in the trousers press mode; the leg 85 is pivotally attached to leg 82 at 86 and pivotally and slidably to the underside of the lower plate assembly at 87. The upper ends of the legs are relatively slidable towards and away from each other for the purpose of height adjustment, controlled by lever 88 which releases the legs or locks them at a desired height position. The lower ends of the legs terminate in ground-engaging pads 89

at least one of which may comprise a roller, for facilitating height adjustment.

By "plate assembly" is meant to include body or chassis components, heater elements, electrical connections thereto, padding, surface covering material, grippers for trousers, and the like, as required.

In Figure 9, a cordless iron 10 is shown in the rest position on the support platform turntable 18.

Figure 10 illustrates an expanding hinge for use at position 78 in Figure 7. The hinge consists of a spring steel bracket 101 attached to the lower plate assembly at 102 and to the upper plate assembly at 103. The upper and lower plate assemblies 74 and 72 are shown closed, but the open position for insertion of a garment to be pressed is shown in dashed outline and it will be understood that the thickness of the garment in the nip of the pressing surfaces is accommodated by the flexion of the bracket by virtue of the U bend formed therein at 104, in that the distance between the mounting points 102 and 103 can be expanded. The end of the lower plate pressing surface is supported with a degree of resilience by spring steel bracket 105.

Figure 11 illustrates a control circuit for controlling the temperature of an iron and an ironing board from a single setting on a control panel.

Referring now to Figure 12, the performance of a cordless iron fitted with control circuitry as hereinbefore described is compared with a commercially-available cordless iron controlled by a traditional thermostat. In the graph, the temperatures of 120°C, 160°C and 210°C are recommended by the Home Laundry Consultative Council as being suitable for pressing for example nylons; other man-made textile fabrics and mixtures; and linens and cottons respectively. The prior art iron was tested at all three settings and is seen to fluctuate widely below the set temperatures, (curves 1, 2 and 3 respectively), whereas the inventive iron, which was tested only at the highest setting, was controlled to within a narrow temperature band on either side of the set temperature (curve 4).

Claims

1. Ironing apparatus comprising:-

a cordless iron (10) comprising a sole plate (12), a heater element which can be electrically energised and a temperature sensor in thermal contact with the sole plate;

a control module including a support platform (14) for the iron and control circuitry including temperature selection means; and

cooperative interengagement means on the iron and the support;

characterised in that the cooperative interengagement means comprises:

a tongue (20) on the tail end of the iron, the tongue having electrical contacts (22, 24) on an upper surface thereof connected to said heater element; and

an abutment means (54) disposed in a recess in the support platform, wherein the mouth of the recess is formed with an undercut region (26, 27), which undercut region can accommodate the tongue of the iron when the iron is interengaged in a rest position with the support platform, the abutment means comprising electrical contacts (28) which can be connected to a source of electrical power;

the arrangement being such that, in the rest position, the iron is disposed over-centre at a forwardly upwardly sloping angle such that the upper surface of the tongue engages the abutment means of the support platform in the undercut region and the iron is maintained in the rest position under the influence of gravity such that the electrical contacts on the tongue are maintained in contact with the contacts in the abutment means; wherein the supply of electrical power to the heater element is varied by the control circuitry according to the perceived temperature of the sole plate in relation to a temperature set by the temperature selection means.

2. Ironing apparatus as claimed in claim 1 characterised in that the iron is locatable in or removable from its rest position via a disconnected position, the iron describing a forward pivotal movement with respect to the support platform on moving the iron from the disconnected position to the rest position.

3. Ironing apparatus as claimed in claim 1 or claim 2 characterised in that the undercut region has sidewalls which receive the tongue with marginal clearance and/or extend upwardly as raised upstanding formations (19) to enhance the lateral stability of the iron in the rest position.

4. Ironing apparatus as claimed in any preceding claim, further including mechanical and/or electrical isolation means to prevent access to live electrical contacts in the undercut region when the iron is removed therefrom.

5. Ironing apparatus as claimed in any preceding claim characterised by mechanical shrouds or shutters (30) in the undercut region, said mechanical shrouds or shutters being biased in a closed position to cover the electrical contacts

(28) in the abutment means and movable to an open position when the iron is located in its rest position to permit the contacts on the iron to contact the electrical contacts on the abutment means.

6. Ironing apparatus as claimed in claim 5 characterised in that on locating the iron in the rest position, said tongue engages a shutter-opening mechanism (31, 32) thereby to move the mechanical shrouds or shutters to the open position, whereby the shutters provide protection until the tongue effectively blocks access to the contacts.
7. Ironing apparatus as claimed in any preceding claim characterised in that the electrical contacts in the abutment means are movably mounted and biased in a retracted position in which they are contained in a housing, said electrical contacts being movable against the bias to an extended position in which they protrude from the housing for engagement with contacts on the iron; the electrical contacts in the abutment means being movable from the retracted position to the extended position by the iron on location of the iron in its rest position.
8. Ironing apparatus as claimed in any preceding claim, further including means to prevent arcing between the electrical contacts on the iron and support platform on moving the iron between its rest and disconnected positions.
9. Ironing apparatus as claimed in any preceding claim characterised in that the contacts on the iron and/or the abutment means are arranged such that on location of the iron in the support platform in the rest position, the contacts are connected in a predetermined sequence to avoid arcing across live contacts.
10. Ironing apparatus as claimed in claim 9 characterised by earth contacts (22), live and neutral contacts (23) and temperature sensor contacts (24), the latter forming part of a switching circuit to control the supply of power to the live contact; the arrangement being such that on location of the iron in the support platform in the rest position, the sequence of engagement is firstly the earth contact, secondly the live and neutral contacts, and thirdly the power sensor contacts, whereby the live and neutral contacts are engaged before power is permitted to flow to the live contact.

11. Ironing apparatus as claimed in claim 9 or claim 10 characterised in that power switching is performed by triacs.

- 5 12. Ironing apparatus as claimed in any of claims 9 to 11, characterised in that the engagement sequence of the contacts is not completed in less than 10 m.secs.
- 10 13. Ironing apparatus as claimed in any preceding claim, characterised by the use of feedback control from the temperature sensor thereby to enable a higher-rated element to be used with a greater degree of sensitivity in the control thereof as compared with thermostatically-controlled arrangements.
- 15 14. Ironing apparatus as claimed in any preceding claim, in which the control module is incorporated in an ironing board (71).
- 20 15. Ironing apparatus as claimed in claim 14, in which the ironing board includes a heater element, the iron and board heater elements being controlled by the same control circuitry, typically by means of a common microprocessor.
- 25 16. Ironing apparatus as claimed in claim 15, in which the ironing surface of the board comprises a plate (74) which cooperates with an underlying plate (72) to form a trousers press, the underlying plate being connected to a support system for maintaining the plates above ground level either substantially horizontally disposed for use in an ironing mode or substantially upright disposed for use in a trousers pressing mode.
- 30 17. Ironing apparatus as claimed in claim 16, in which the plates are hingeably connected together by a displaceable hinge (101) which permits the plates to move apart one from the other in the trousers pressing mode while remaining substantially mutually parallel, thereby to accommodate different thicknesses of items to be pressed while maintaining an even overall pressure thereon.
- 35 18. Ironing apparatus as claimed in 16 or claim 17, in which the underlying plate has a heater element controlled by the same control circuitry as and to independently-programmable temperatures relative to the heater element in the ironing plate.
- 40 19. Ironing apparatus as claimed in any preceding claim characterised by an ironing board includ-
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ing an ironing surface and two foldable legs for supporting the ironing surface above ground level in service; wherein each leg is pivotably attached at an upper end of the leg towards a respective end of an underside of the ironing surface and has a foot (89) at a lower end of the leg, the legs being pivoted one to the other at a pivot point (86) intermediate the upper and lower ends of each leg, a first leg (82) having a knee joint means (84) intermediate the upper end of the first leg and the pivot point; the arrangement being such that in an open position, with the knee joint means locked, the legs describe an X configuration in which the ironing surface is supported in a generally horizontal plane above ground level, and with the knee joint means in a broken position the legs can be pivoted one with respect to the other about the pivot point to a fully closed position in which upper and lower parts of the first leg above the pivot point are folded together and the feet of the legs are disposed adjacent one another in juxtaposition with one end of the ironing surface.

20. Ironing apparatus as claimed in claim 19 characterised in that, with the knee joint means in the broken position, upper and lower parts of the first leg above the pivot point can be folded together to lower the one end of the ironing surface with respect to the other end in an intermediate position, while maintaining sufficient spacing between the feet of the legs to support the ironing board on the ground in a free-standing position.

21. Ironing apparatus as claimed in claim 19 or claim 20 characterised in that the other leg (85) is slidably attached (87) to the underside of the ironing surface to act as a lost-motion linkage on opening or closing of the legs thereby to allow height adjustment of the board.

22. Ironing apparatus as claimed in any of claims 19 to 21, in which the ironing board has a heatable ironing surface.

23. Ironing apparatus as claimed in any of claims 19 to 22, in which the ironing board includes a separate pressure plate to enable the apparatus to form a trousers press.

Patentansprüche

1. Bügelvorrichtung, die umfaßt:
ein schnurloses Bügeleisen (10), das eine Bügelsohle (12) umfaßt, ein Heizelement, das elektrisch unter Spannung gesetzt werden

kann, sowie einen Temperatursensor, der mit der Bügelsohle in thermischem Kontakt ist;
ein Steuermodul, der eine Auflageplattform (14) für das Bügeleisen enthält, sowie eine Regelschaltung, die eine Temperaturwahleinrichtung enthält; und

zusammenwirkende Eingriffseinrichtungen an dem Bügeleisen und der Auflage;

dadurch gekennzeichnet, daß die zusammenwirkenden Eingriffseinrichtungen umfassen:

eine Zunge (20) am hinteren Ende des Bügeleisens, wobei die Zunge elektrische Kontakte (22,24) an einer Oberseite derselben aufweist, die mit dem Heizelement verbunden sind; und eine Anschlageneinrichtung (54), die in einer Aussparung in der Auflageplattform angeordnet ist, wobei die Öffnung der Aussparung mit einem unterschrittenen Bereich (26,27) versehen ist, wobei der unterschrittene Bereich die Zunge des Bügeleisens aufnehmen kann, wenn das Bügeleisen in einer Ruhestellung mit der Auflageplattform in Eingriff ist, wobei die Anschlageneinrichtung elektrische Kontakte (28) umfaßt, die mit einer Quelle elektrischer Energie verbunden werden können;

wobei die Anordnung so ist, daß das Bügeleisen in der Ruhestellung übermittigt in einem nach vorn und oben geneigten Winkel angeordnet ist, so daß die Oberseite der Zunge mit der Anschlageneinrichtung der Auflageplattform in dem unterschrittenen Bereich in Kontakt ist, und das Bügeleisen unter der Wirkung der Schwerkraft in der Ruhestellung gehalten wird, so daß die elektrischen Kontakte an der Zunge mit den Kontakten in der Anschlageneinrichtung in Kontakt gehalten werden; wobei die Zufuhr elektrischer Energie zu dem Heizelement durch die Regelschaltung entsprechend der wahrgenommenen Temperatur der Bügelsohle im Verhältnis zu einer durch die Temperaturwahleinrichtung eingestellten Temperatur geändert wird.

2. Bügelvorrichtung nach Anspruch 1, **dadurch gekennzeichnet**, daß das Bügeleisen über eine getrennte Position in seine Ruhestellung gebracht bzw. aus ihr entfernt werden kann, wobei das Bügeleisen eine vorwärtsgerichtete Schwenkbewegung in bezug auf die Auflageplattform ausführt, wenn das Bügeleisen aus der getrennten Stellung in die Ruhestellung bewegt wird.

3. Bügelvorrichtung nach Anspruch 1 oder Anspruch 2, **dadurch gekennzeichnet**, daß der unterschrittene Bereich Seitenwände aufweist, die die Zunge mit Abstand am Rand aufnehmen

men und/oder sich als erhabene aufrechtstehende Strukturen (19) nach oben erstrecken und so die seitliche Stabilität des Bügeleisens in der Ruhestellung verbessern.

4. Bügelvorrichtung nach einem der vorangehenden Ansprüche, die des weiteren mechanische und/oder elektrische Isoliereinrichtungen enthält, die Zugang zu spannungsführenden elektrischen Kontakten in dem unterschrittenen Bereich verhindern, wenn das Bügeleisen daraus entnommen ist.

5. Bügelvorrichtung nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** mechanische Abdeckungen oder Verschlüsse (30) in dem unterschrittenen Bereich, wobei die mechanischen Abdeckungen oder Verschlüsse in eine geschlossene Stellung gedrückt werden, um die elektrischen Kontakte (28) in der Anschlageneinrichtung abzudecken, und in eine offene Stellung bewegt werden können, wenn sich das Bügeleisen in seiner Ruhestellung befindet, so daß die Kontakte an dem Bügeleisen mit den elektrischen Kontakten an der Anschlageneinrichtung in Kontakt kommen können.

6. Bügelvorrichtung nach Anspruch 5, **dadurch gekennzeichnet**, daß beim Einführen des Bügeleisens in die Ruhestellung die Zunge mit einem Verschlußöffnungsmechanismus (31,32) in Kontakt kommt und so die mechanischen Abdeckungen oder Verschlüsse in die offene Stellung bewegt, so daß die Verschlüsse Schutz gewährleisten, bis die Zunge den Zugang zu den Kontakten wirksam verhindert.

7. Bügelvorrichtung nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet**, daß die elektrischen Kontakte in der Anschlageneinrichtung beweglich angebracht sind und in eine eingezogene Stellung gedrückt werden, in der sie sich in einem Gehäuse befinden, wobei die elektrischen Kontakte gegen den Druck in eine ausgefahrne Stellung bewegt werden können, in der sie aus dem Gehäuse vorstehen und mit Kontakten an dem Bügeleisen in Kontakt kommen; wobei die elektrischen Kontakte in der Anschlageneinrichtung durch das Bügeleisen aus der eingezogenen Stellung in die ausgefahrne Stellung bewegt werden können, wenn das Bügeleisen in seine Ruhestellung gebracht wird.

8. Bügelvorrichtung nach einem der vorangehenden Ansprüche, die des weiteren eine Einrichtung enthält, die Lichtbogenbildung zwischen

den elektrischen Kontakten an dem Bügeleisen und der Auflageplattform verhindert, wenn das Bügeleisen zwischen seiner Ruhe- und seiner getrennten Stellung bewegt wird.

9. Bügelvorrichtung nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet**, daß die Kontakte an dem Bügeleisen und/oder der Anschlageneinrichtung so angeordnet sind, daß die Kontakte beim Einführen des Bügeleisens in die Auflageplattform in die Ruhestellung in einer vorgegebenen Reihenfolge miteinander verbunden werden, um Lichtbogenbildung über spannungsführende Kontakte zu verhindern.

10. Bügelvorrichtung nach Anspruch 9, **gekennzeichnet durch** Erdkontakte (22), spannungsführende und neutrale Kontakte (23) und Temperatursensorkontakte (24), wobei letztere Teil eines Schaltkreises bilden, der die Zufuhr von Spannung zu den spannungsführenden Kontakten steuert; wobei die Anordnung so ist, daß beim Einführen des Bügeleisens in die Auflageplattform in die Ruhestellung als erstes der Erdkontakt, als zweites die spannungsführenden und die neutralen Kontakte und als drittes die Spannungssensorkontakte in Kontakt kommen, so daß die spannungsführenden und neutralen Kontakte in Kontakt kommen, bevor Spannung zu dem spannungsführenden Kontakt fließen kann.

11. Bügelvorrichtung nach Anspruch 9 oder Anspruch 10, **dadurch gekennzeichnet**, daß Leistungsschalten durch Triacs ausgeführt wird.

12. Bügelvorrichtung nach einem der Ansprüche 9 bis 11, **dadurch gekennzeichnet**, daß die Kontaktfolge der Kontakte in nicht weniger als 10 msec ausgeführt wird.

13. Bügelvorrichtung nach einem der vorangehenden Ansprüche, **gekennzeichnet durch** den Einsatz von Rückkopplungsregelung von dem Temperatursensor, um so den Einsatz eines Elementes mit höherer Nennleistung bei einem größeren Grad an Empfindlichkeit bei der Regelung desselben im Vergleich zu thermostategeregelten Anordnungen zu ermöglichen.

14. Bügelvorrichtung nach einem der vorangehenden Ansprüche, wobei der Regelmodul in ein Bügelbrett (71) integriert ist.

15. Bügelvorrichtung nach Anspruch 14, wobei das Bügelbrett ein Heizelement enthält, wobei die

Heizelemente des Bügeleisens und des Brettes durch dieselbe Regelschaltung, normalerweise mittels eines gemeinsamen Mikroprozessors, geregelt werden.

16. Bügelvorrichtung nach Anspruch 15, wobei die Bügelfläche des Brettes eine Platte (74) umfaßt, die mit einer darunterliegenden Platte (72) zusammenwirkt und so eine Hosenbügeleinrichtung bildet, wobei die darunterliegende Platte mit einem Stützsystem verbunden ist, das die Platten entweder bei Einsatz in einem Bügelbetrieb im wesentlichen horizontal angeordnet oder beim Einsatz in einem Hosenbügelbetrieb im wesentlichen senkrecht angeordnet über dem Boden hält. 5
17. Bügelvorrichtung nach Anspruch 16, wobei die Platten mit einem verschiebbaren Gelenk (101) gelenkig miteinander verbunden sind, durch das die Platten im Hosenbügelbetrieb auseinanderbewegt werden können, wobei sie im wesentlichen parallel zueinander bleiben, um so unterschiedliche Dicken von zu bügelnden Gegenständen aufzunehmen, wobei ein gleichmäßiger Gesamtdruck darauf aufrechterhalten wird. 10
18. Bügelvorrichtung nach Anspruch 16 oder 17, wobei die darunterliegende Platte ein Heizelement aufweist, das mit derselben Regelschaltung und auf unabhängig programmierbare Temperaturen in Bezug auf das Heizelement in der Bügelplatte gesteuert wird. 15
19. Bügelvorrichtung nach einem der vorangehenden Ansprüche, gekennzeichnet durch ein Bügelbrett, das eine Bügelfläche und zwei zusammenklappbare Beine enthält, die die Bügelfläche in Betrieb über dem Boden tragen; wobei jedes Bein schwenkbar an einem oberen Ende des Beins in Richtung eines entsprechenden Endes an einer Unterseite der Bügelfläche angebracht ist und einen Fuß (89) am unteren Ende des Beins aufweist, wobei die Beine an einem Drehpunkt (86) zwischen dem oberen und dem unteren Ende jedes Beins gelenkig aneinander angebracht sind, wobei ein erstes Bein (82) eine Kniegelenkeinrichtung (84) zwischen dem oberen Ende des ersten Beins und dem Drehpunkt aufweist; wobei die Anordnung so ist, daß in einer offenen Stellung, in der die Kniegelenkeinrichtung festgestellt ist, die Beine eine X-Form bilden, in der die Bügelfläche in einer im allgemeinen horizontalen Ebene über dem Boden getragen wird, und wenn sich die Kniegelenkeinrichtung in einer eingeknickten Stellung befindet, die 20

Beine zueinander um den Drehpunkt in eine vollständig geschlossene Stellung geschwenkt werden können, in der der obere Teil und der untere Teil des ersten Beins oberhalb des Drehpunktes zusammengeklappt werden, und die Füße der Beine aneinandergrenzend neben einem Ende der Bügelfläche angeordnet sind.

20. Bügelvorrichtung nach Anspruch 19, **dadurch gekennzeichnet**, daß, wenn sich die Kniegelenkeinrichtung in der eingeknickten Stellung befindet, der obere und der untere Teil des ersten Beins oberhalb des Drehpunktes zusammengeklappt werden können, um das eine Ende der Bügelfläche in Bezug auf das andere Ende in eine Zwischenstellung abzusenken, wobei ausreichend Abstand zwischen den Füßen der Beine aufrechterhalten wird, um das Bügelbrett in einer freistehenden Position auf dem Boden zu halten. 25
21. Bügelvorrichtung nach Anspruch 19 oder Anspruch 20, **dadurch gekennzeichnet**, daß das andere Bein (85) verschiebbar an der Unterseite der Bügelfläche angebracht ist (87), so daß es als Leerlaufverbindung beim Öffnen oder Schließen der Beine wirkt und so Höhenverstellung des Brettes ermöglicht. 30
22. Bügelvorrichtung nach einem der Ansprüche 19 bis 21, wobei das Bügelbrett eine beheizbare Bügelfläche aufweist. 35
23. Bügelvorrichtung nach einem der Ansprüche 19 bis 22, wobei das Bügelbrett eine separate Druckplatte umfaßt, um zu ermöglichen, daß die Vorrichtung eine Hosenbügeleinrichtung bildet. 40

Revendications

1. Appareil de repassage comprenant :
un fer sans fil (10) comprenant une semelle (12), un élément chauffant qui peut être alimenté électriquement et un capteur de température en contact thermique avec la semelle ;
un module de commande comprenant une plate-forme de support (14) pour le fer et un circuit de commande incluant un moyen de sélection de la température ; et
un moyen d'accouplement coopératif sur le fer et le support ;
caractérisé en ce que le moyen d'accouplement coopératif comprend :
une languette (20) sur l'extrémité arrière du fer, la languette ayant des contacts électriques (22, 24) sur une face supérieure de la languette connectée audit élément chauffant ; et 45

- un moyen de butée (54) placé dans un évidement à l'intérieur de la plate-forme de support, l'entrée de l'évidement étant formée par une zone en creux (26, 27), cette zone en creux pouvant recevoir la languette du fer lorsque le fer est accouplé en position de repos avec la plate-forme de support, le moyen de butée comprenant des contacts électriques (28) qui peuvent être connectés à une source d'énergie électrique ;
- le dispositif étant tel que, en position de repos, le fer est placé sur le centre, suivant un angle d'inclinaison dirigé vers l'avant et vers le haut, tel que la face supérieure de la languette est en prise avec le moyen de butée de la plate-forme de support dans la zone en creux, et que le fer est maintenu en position de repos sous l'effet de la gravité, de manière que les contacts électriques sur la languette sont maintenus en contact avec les contacts dans le moyen de butée ; l'alimentation en énergie électrique de l'élément chauffant étant modifiée par le circuit de commande en fonction de la température détectée de la semelle par rapport à la température déterminée par le moyen de sélection de la température.
2. Appareil de repassage selon la revendication 1, caractérisé en ce que le fer peut être mis en position de repos ou en être enlevé via une position de déconnexion ou déconnectée, le fer décrivant un mouvement de pivotement vers l'avant par rapport à la plate-forme de support lorsque le fer est déplacé de la position de déconnexion à la position de repos.
 3. Appareil de repassage selon la revendication 1 ou la revendication 2, caractérisé en ce que la zone en creux possède des parois latérales qui reçoivent la languette avec un dégagement aux bords et/ou s'étendant vers le haut comme des éléments (19) s'élevant vers le haut pour accroître la stabilité latérale du fer en position de repos.
 4. Appareil de repassage selon l'une quelconque des revendications précédentes, incluant en outre un moyen d'isolation mécanique et/ou électrique pour empêcher tout accès aux contacts électriques sous tension dans la zone en creux lorsque le fer en est retiré.
 5. Appareil de repassage selon l'une quelconque des revendications précédentes, caractérisé par des enveloppes de protection ou des obturateurs mécaniques (30) dans la zone en creux, ces enveloppes de protection ou obturateurs mécaniques étant inclinés en position fermée de manière à couvrir les contacts électriques (28) dans le moyen de butée et pouvant être placés en position ouverte lorsque le fer se trouve dans sa position de repos afin de permettre le contact entre les contacts sur le fer et les contacts électriques sur le moyen de butée.
 6. Appareil de repassage selon la revendication 5 caractérisé en ce que lorsque le fer est placé en position de repos, ladite languette est amenée en prise avec un mécanisme d'ouverture des obturateurs (31, 32) de façon à déplacer les enveloppes de protection ou les obturateurs mécaniques en position ouverte, les obturateurs apportant une protection jusqu'à ce que la languette bloque effectivement l'accès aux contacts.
 7. Appareil de repassage selon l'une quelconque des revendications précédentes, caractérisé en ce que les contacts électriques dans le moyen de butée sont montés de manière mobile et sont inclinés en position rétractée, dans laquelle ils sont contenus dans un logement, lesdits contacts électriques pouvant se déplacer de la position inclinée à une position d'extension, dans laquelle ils saillent du logement pour être en prise avec les contacts sur le fer ; les contacts électriques dans le moyen de butée pouvant être déplacés de la position rétractée à la position d'extension par le fer, lorsque le fer est placé en position de repos.
 8. Appareil de repassage selon l'une quelconque des revendications précédentes, comprenant en outre un moyen pour empêcher la formation d'un arc entre les contacts électriques sur le fer et la plate-forme de support lorsque le fer est déplacé de la position de repos à la position de déconnexion.
 9. Appareil de repassage selon l'une quelconque des revendications précédentes, caractérisé en ce que les contacts sur le fer et/ou le moyen de butée sont disposés de telle manière que lorsque le fer est placé sur la plate-forme de support en position de repos, les contacts sont connectés dans un ordre prédéterminé afin d'éviter la formation d'un arc entre les contacts sous tension.
 10. Appareil de repassage selon la revendication 9, caractérisé par des contacts de terre (22) des contacts sous tension et neutre (23) et des contacts de capteur de température (24), ces derniers faisant partie d'un circuit de commutation apte à commander l'alimentation en cou-

rant du contact sous tension ; le dispositif étant tel que lorsque le fer est placé sur la plateforme de support en position de repos, la séquence d'enclenchement est, premièrement le contact de terre, deuxièmement, les contacts sous tension et neutre et troisièmement les contacts du capteur de puissance, de sorte que les contacts sous tension et neutre sont enclenchés avant que le courant ne puisse passer dans le contact sous tension.

11. Appareil de repassage selon la revendication 9 ou 10, caractérisé en ce que la commutation de puissance est assurée par des triacs.

12. Appareil de repassage selon l'une quelconque des revendications 9 à 11, caractérisé en ce que la séquence d'enclenchement des contacts n'est pas terminée en moins de 10 m.sec.

13. Appareil de repassage selon l'une quelconque des revendications précédentes, caractérisé par l'utilisation d'un réglage à réaction en retour à partir du capteur de température afin de permettre l'utilisation d'un élément à plus haute intensité avec un degré supérieur de sensibilité dans la commande, en comparaison avec les dispositifs à commande par thermostat.

14. Appareil de repassage selon l'une quelconque des revendications précédentes, dans lequel le module de commande est incorporé dans une planche à repasser (71).

15. Appareil de repassage selon la revendication 14, dans lequel la planche à repasser comprend un élément chauffant, les éléments chauffants du fer et de la planche étant commandés par le même circuit de commande, généralement au moyen d'un microprocesseur commun.

16. Appareil de repassage selon la revendication 15, dans lequel la surface de repassage de la planche comprend une plaque (74) qui est associée à une plaque sous-jacente (72) pour former une presse à pantalons, la plaque sous-jacente étant reliée à un système de support pour maintenir les plaques au-dessus du sol, soit essentiellement à l'horizontale, en position pour une utilisation en mode de repassage, soit essentiellement à la verticale, en position pour une utilisation en mode presse à pantalons.

17. Appareil de repassage selon la revendication 16, dans lequel les plaques sont connectées

ensemble de manière articulée par une articulation ou charnière (101) déplaçable qui permet aux plaques d'être déplacées indépendamment l'une de l'autre en mode presse à pantalons, tout en restant essentiellement parallèles l'une par rapport à l'autre, afin de s'adapter aux différentes épaisseurs des articles à presser, tout en maintenant sur ces articles une pression globale uniforme.

18. Appareil de repassage selon la revendication 16 ou 17, dans lequel la plaque sous-jacente possède un élément chauffant commandé par le même circuit de commande que pour des températures programmables indépendamment en fonction de l'élément chauffant de la plaque de repassage.

19. Appareil de repassage selon l'une quelconque des revendications précédentes, caractérisé par une planche à repasser comprenant une surface de repassage et deux pieds repliables pour soutenir la surface de repassage au-dessus du sol pendant l'utilisation ; dans lequel chaque pied est fixé de manière pivotante par une extrémité supérieure du pied vers une extrémité respective d'une surface inférieure de la surface de repassage et possède un piètement (89) à une extrémité inférieure du pied, les pieds pivotant l'un vers l'autre en un point de pivotement (86) situé entre les extrémités supérieure et inférieure de chaque pied, un premier pied (82) ayant un moyen d'articulation en coude (84) situé entre l'extrémité supérieure du premier pied et le point de pivotement ; le dispositif étant tel qu'en position ouverte, lorsque le moyen d'articulation en coude est bloqué, les pieds sont agencés suivant une configuration en X dans laquelle la surface de repassage est soutenue en un plan généralement horizontal au-dessus du sol, et lorsque le moyen d'articulation en coude est en position cassée, les pieds peuvent être pivotés l'un par rapport à l'autre autour du point de pivotement jusqu'à une position complètement fermée dans laquelle les parties supérieure et inférieure du premier pied, au-dessus du point de pivotement sont repliés ensembles et les piètements des pieds sont placés côte à côte, juxtaposés à une extrémité de la surface de repassage.

20. Appareil de repassage selon la revendication 19 caractérisé, en ce que le moyen d'articulation en coude étant en position cassée, les parties supérieure et inférieure du premier pied, au-dessus du point de pivotement, peuvent être repliées ensemble pour abaisser l'ex-

trémité de la surface de repassage par rapport à l'autre extrémité en une position intermédiaire, tout en maintenant un espace suffisant entre les piètements des pieds pour supporter la planche à repasser debout sur le sol.

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- 21.** Appareil de repassage selon la revendication 19 ou la revendication 20, caractérisé en ce que l'autre pied (85) est fixé de façon à pouvoir coulisser (87) à la surface inférieure de la surface de repassage pour agir comme un mécanisme à course morte lors de l'ouverture ou de la fermeture des pieds permettant ainsi d'ajuster la hauteur de la planche.

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- 22.** Appareil de repassage selon l'une quelconque des revendications 19 à 21, dans lequel la planche à repasser possède une surface de repassage pouvant être chauffée.

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- 23.** Appareil de repassage selon l'une quelconque des revendications 19 à 22, dans lequel la planche à repasser comprend une plaque de pression séparée pour permettre à l'appareil de prendre la forme d'une presse à pantalons.

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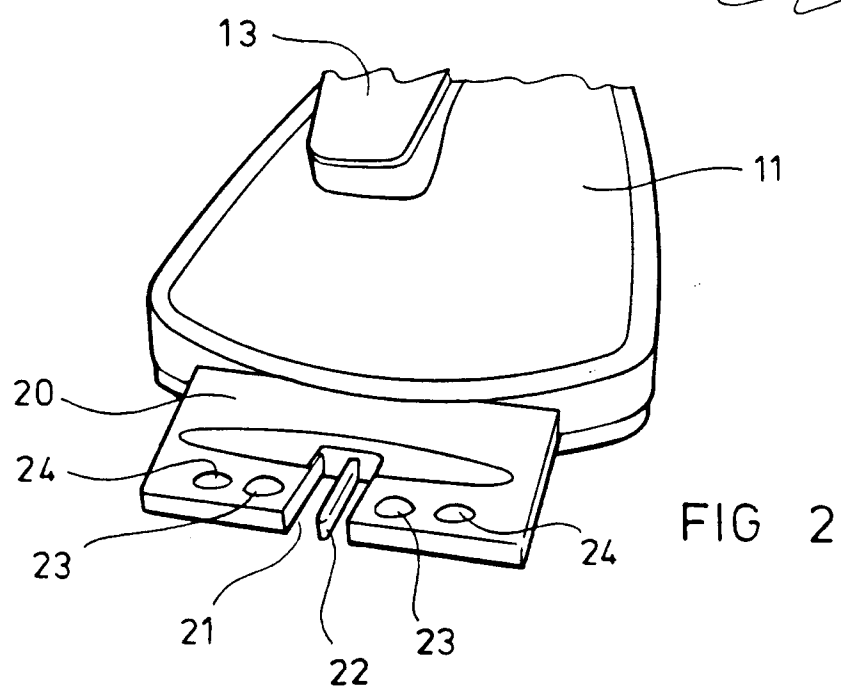
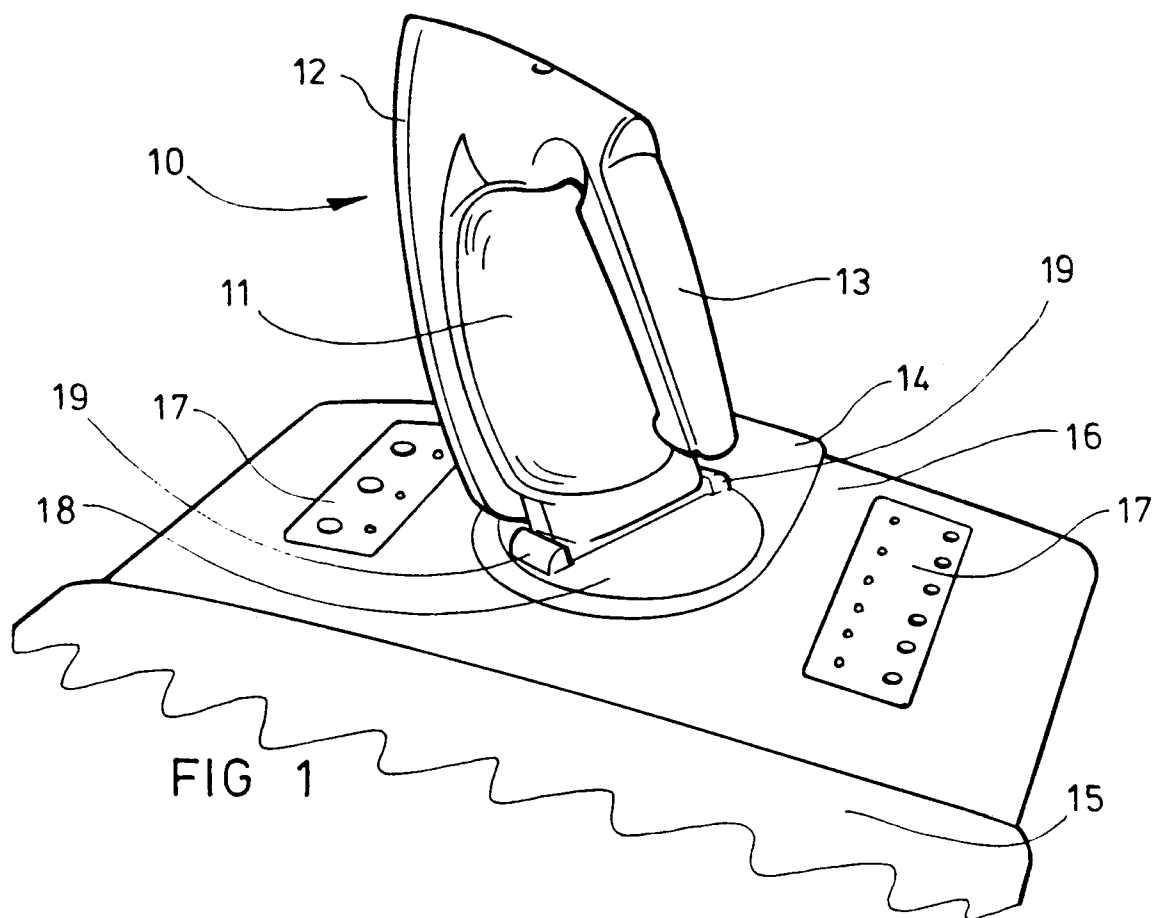
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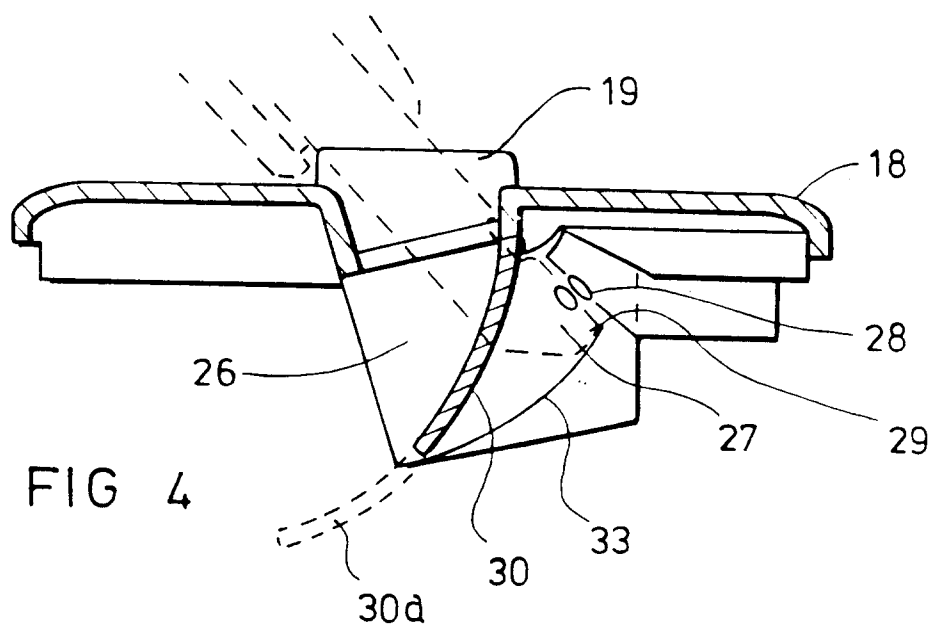
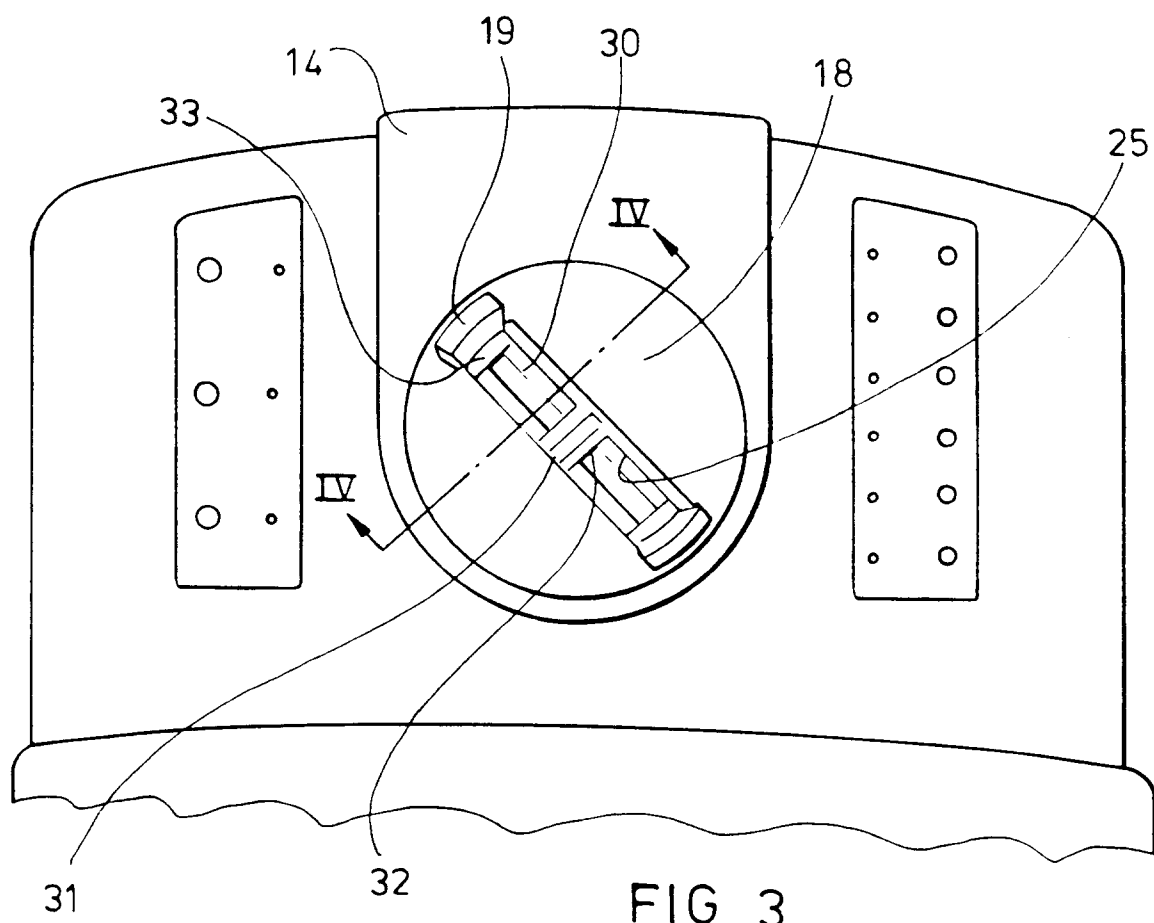
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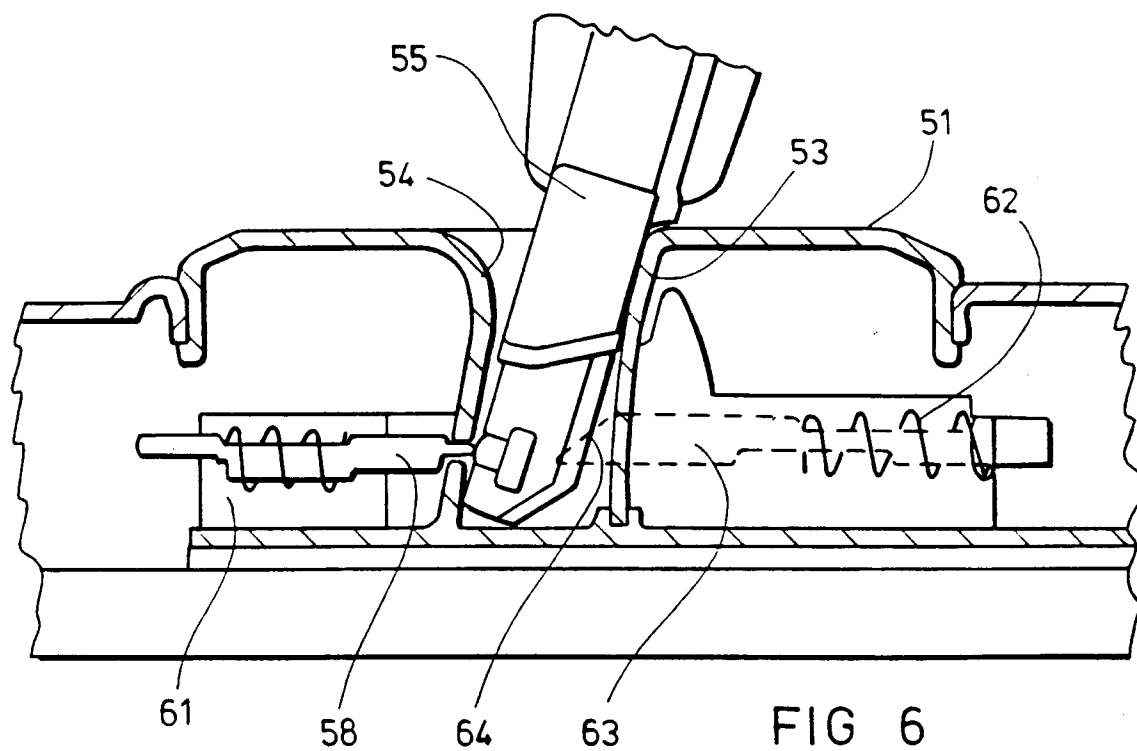
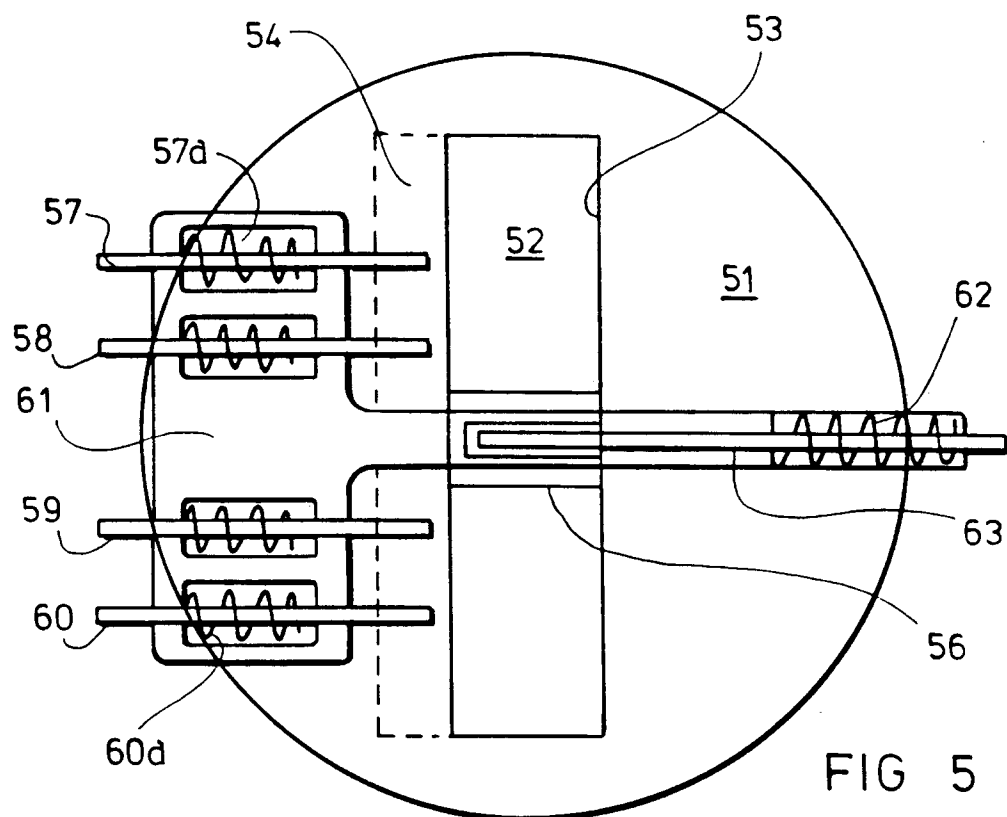
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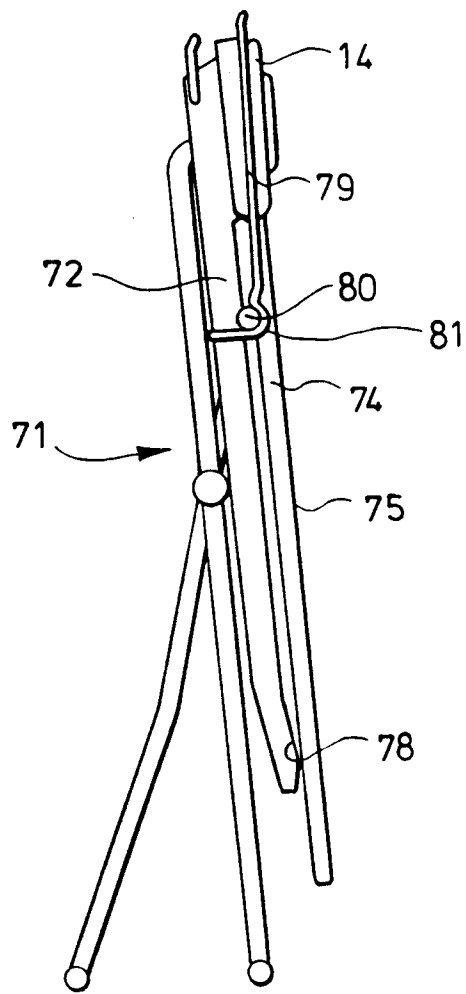


FIG 7

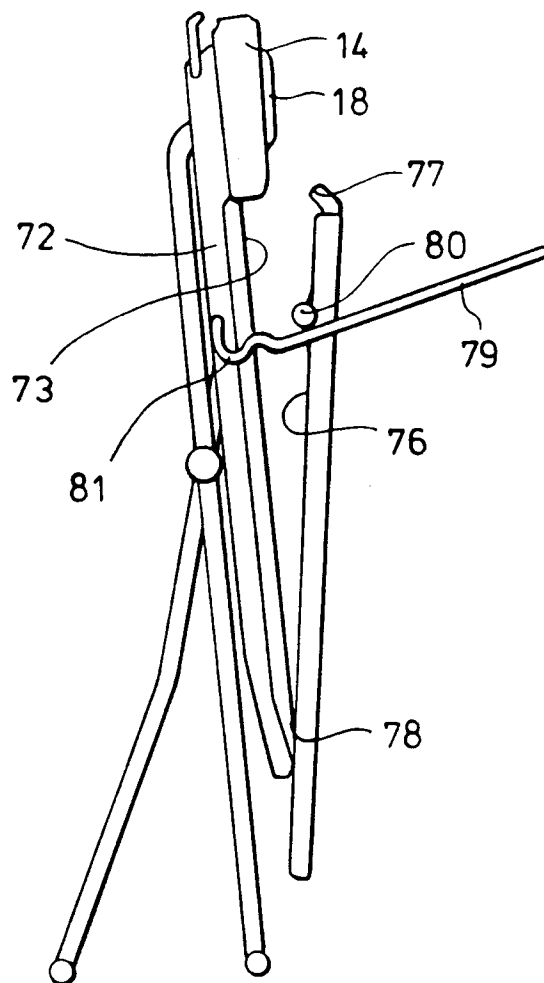


FIG 8

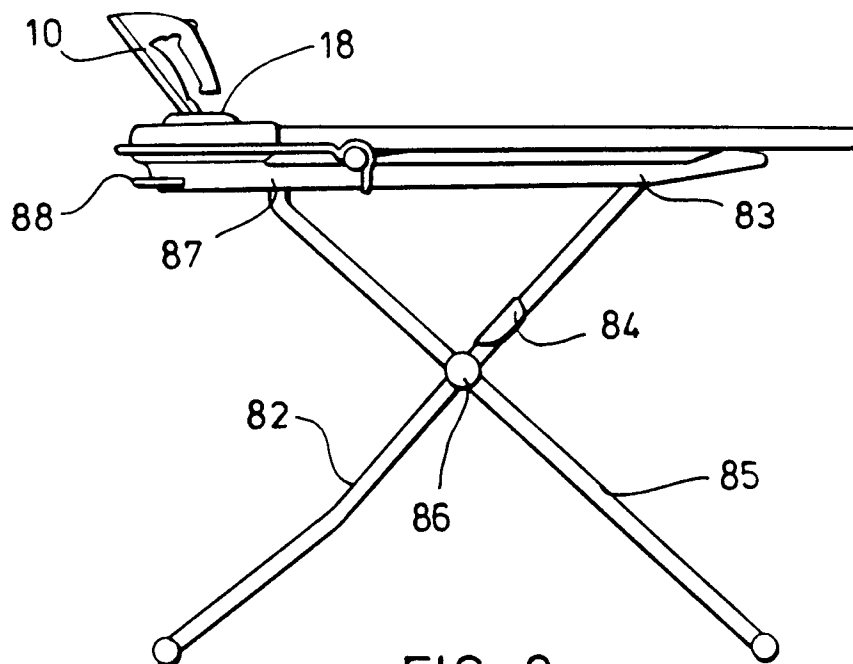


FIG 9

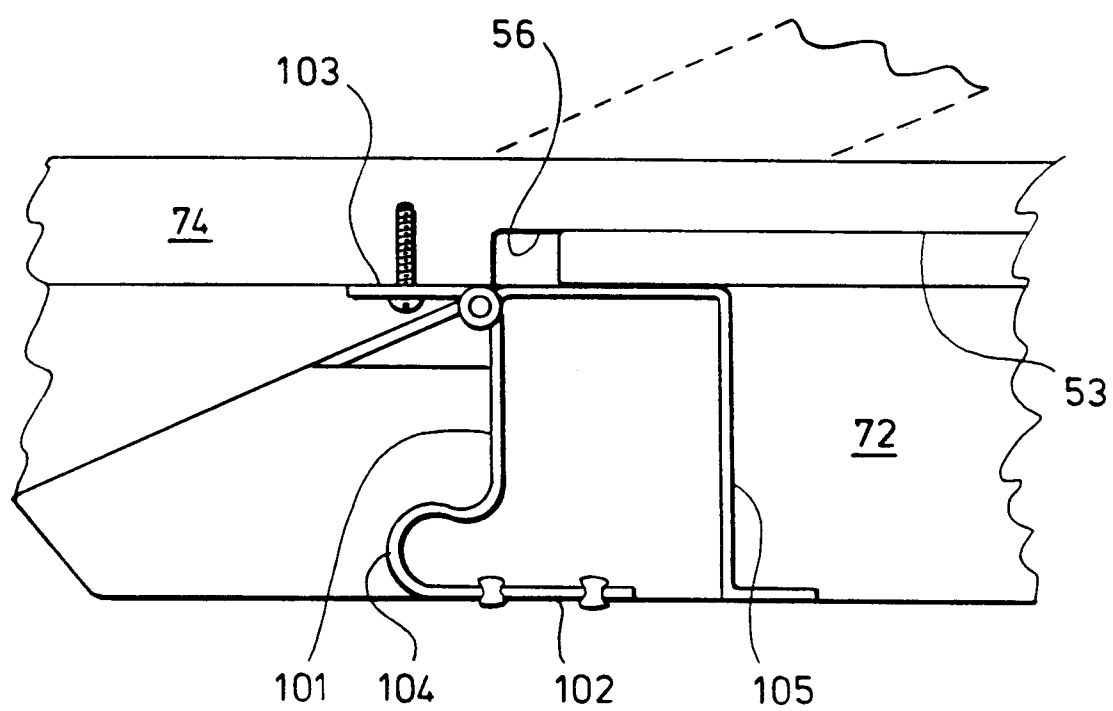


FIG 10

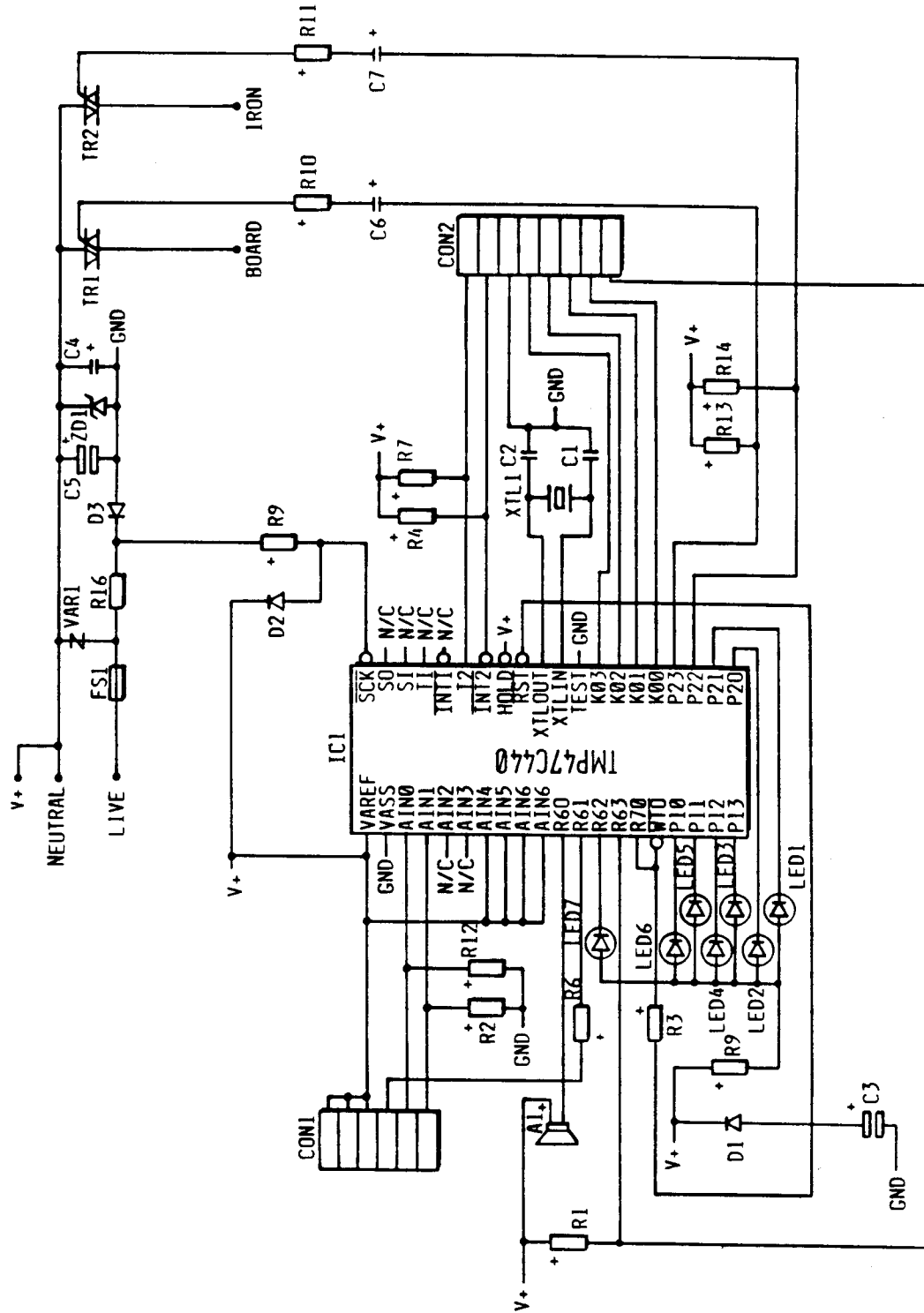


FIG 11

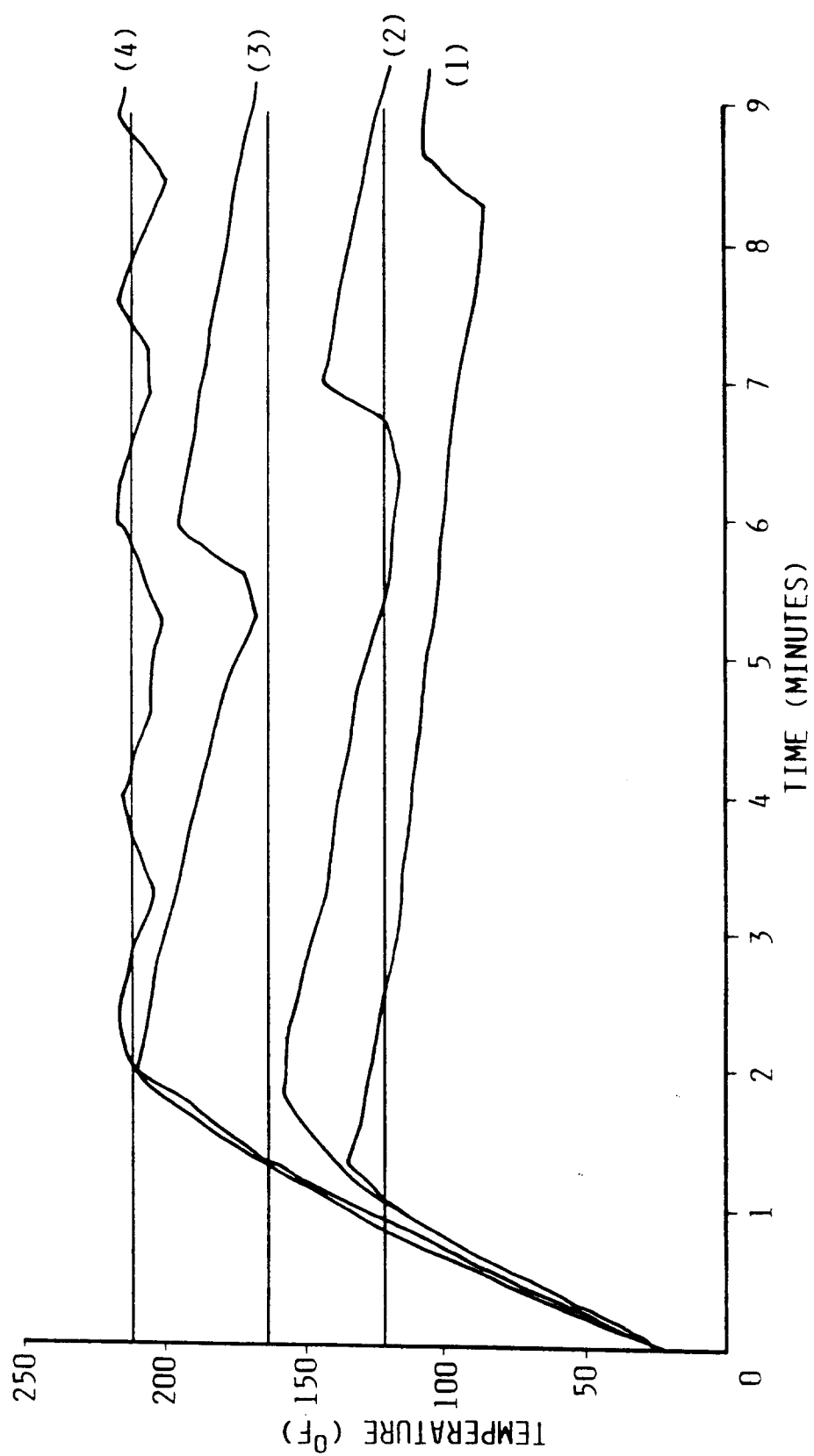


FIG 12